and held by every device known to architects and engineers were wrenched off and hurled into the streets. The destruction of telegraph material was phenomenal. The poles were blown down in long rows, not singly, but in groups of a dozen or more at a time.

The western end of the Eads Bridge—admittedly one of the finest in the world—was destroyed. The same fate overtook other splendid bridges spanning the Mississippi.

The scene on the river at the moment the cyclone passed over it was awe-inspiring. The river tossed and boiled as though it was a whirlpool. Great waves struck the vessels and swamped them. Some steamers were blown bodily high up upon the banks, and others were twisted right round. Others, again, after being torn from their moorings disappeared in the torrent and were never more seen. As a rule the smaller craft did not live in the terrible sea for a minute, but just capsized and sank.

In the smaller places through which the tornado passed the terrible funnels rose and fell as they swiftly moved, and thus the line of destruction was not continuous. But whatever stood in their path was either destroyed or badly damaged, and all this destruction was done within the space of one hour.

About five hundred persons are reported to have been killed during the passage of the tornado, and more than seven hundred injured. The path followed is now shown to be a well-defined track about half a mile wide and four miles long.

NOTES.

THE second of the two annual conversaziones of the Royal Society, to which ladies as well as gentlemen are invited, will take place on Wednesday, June 10.

THE University of Paris will be represented at the forthcoming jubilee of Lord Kelvin, by MM. Moissan, Lippmann and Picard. The Royal Astronomical Society has appointed the President, Dr. A. A. Common, F.R.S., as its representative upon that occasion; and the Senate of the University of Sydney have appointed the Chancellor, Sir William Windeyer, and Prof. Liversidge, F.R.S., the Dean of the Faculty of Science, to represent them.

WE have referred from time to time to the approaching eclipse of the sun. During the last week some members of the expedition to Japan have sailed. From information received from the Japanese Minister, the reports of the bad weather chances at the station chosen are more than confirmed. The mean of the last five years gives for August—

	Days
Clear	0
Cloudy	22
Rain or snow	22

With regard to the Norwegian parties, Dr. Common will occupy a station at Vadsö, and in his neighbourhood will be Dr. Copeland. Mr. Norman Lockyer intends, if possible, to observe on the south side of Varanger fjord, if a suitable anchorage and observing station can be found sufficiently near the totality line. This point will be inquired into by Captain King Hall, of H.M.S. *Volage*, which will be detached from the Training Squadron for this purpose.

LIEUTENANT PEARY is making arrangements for another trip to Greenland, one of the objects being to bring back for the Philadelphia Academy of Sciences the forty-ton meteorite discovered by him last year, being the largest in the world. He will shortly give an account of his important explorations in Northern Greenland to the Royal Geographical Society.

THE Council of the British Medical Association desire to remind members of the profession engaged in researches for the advancement of medicine and the allied sciences, that they are prepared to receive applications for grants in aid of such research. Applications for sums to be granted at the next annual meeting must be made on or before June 15, in writing, addressed to the General Secretary, at the office of the Association, 429 Strand, W.C.

THE Commissioners of the proposed zoological park of New York City have selected as the site that portion of Bronx Park lying south of Pelham Avenue, comprising two hundred and sixty-one acres. It is expected that their selection will be approved. The site is near the new botanical garden, and New York City will thus acquire in this year ample zoological and botanical gardens and an aquarium.

PROF. N. L. BRITTON has been appointed superintendent of the new botanical garden of New York City.

THE death is announced of M. Raulin, Professor of Industrial and Agricultural Chemistry in the University of Lyons.

THE Paris correspondent of the *Times* announces the death, at the age of eighty-two, of M. Daubrée, the eminent geologist. Born at Metz, and educated at the Polytechnic School, Paris, he was sent on a geological mission to Algeria, and from 1839 to 1855 was a Professor at Strasburg University. He was then promoted to a chair at the School of Mines and the Natural History Museum, Paris. His experimental researches, on the action of rapidly moving and high-pressure gases on rock masses, and the application of the results to peculiar rock formations, are still fresh in the minds of every one interested in geological problems.

WE regret to notice the death of Sir J. Russell Reynolds, F.R.S., on Friday last, at the age of sixty-eight. He was educated at University College, London, where he became Professor of the Principles and Practice of Medicine in 1865. Four years later he was elected a Fellow of the Royal Society. He was President of the British Medical Association in 1895, in which year he also received the honorary LL.D. degree at Aberdeen, and recently a similar honour was conferred upon him by the Edinburgh University. On the death of Sir Andrew Clark, in 1893, he was elected President of the Royal College of Physicians, which post feeble health compelled him reluctantly to relinquish at the recent annual election. Sir Russell Reynolds' works on diseases of the brain and spinal cord are valuable contributions to medical literature, and the "System of Medicine," of which he was the editor, stands as a proof of his sound sense and good judgment.

THE forty-first annual exhibition of the Royal Photographic Society will be held from September 28 to November 12, in the gallery of the Royal Society of Painters in Water Colours. Negatives, transparencies, photo-mechanical prints, stereoscopic work, photographs of purely scientific interest, photographs coloured by scientific or mechanical means, and photographic apparatus will be admitted. Foreign exhibitors are invited to contribute photographs or apparatus. Exhibits must be received by the Secretary of the Royal Photographic Society, on or before September 9.

THE President of the Board of Trade has appointed a Committee, consisting of the following gentlemen, viz.:—Lord Blythswood (chairman), Sir Benjamin Baker, K.C.M.G., F.R.S., Sir J. Lowthian Bell, Bart., F.R.S., Prof. Wyndham Dunstan, F.R.S., Prof. A. B. W. Kennedy, F.R.S., Major F. A. Marindin, R.E., C.M.G., Mr. E. P. Martin, Prof. W. C. Roberts-Austen, C.B., F.R.S., Dr. T. E. Thorpe, F.R.S., Prof. W. C. Unwin, F.R.S., and Mr. E. Windsor Richards—to inquire as to the extent of loss of strength in steel rails produced by their prolonged user on railways under varying conditions, and what steps can be taken to prevent the risk of accidents arising through such loss of strength. Mr. W. F. Marwood, of the Board of Trade, has been appointed to act as Secretary to the Committee.

By the will of the late George Yeoman Heath, Professor of Surgery in the University of Durham, and President of the Durham College of Medicine, a sum of £200 is awarded every second year for a surgical essay. We learn from the *Lancet* that the second award will be given to the writer of the best essay on "Congenital Deformities, their Pathology and Treatment." All graduates in medicine or in surgery of the University of Durham are eligible to compete for this scholarship, and the essay, which must be type-written or printed, should be delivered to the trustees not later than March 31, 1898. The essay, together with any specimens, drawings, casts, microscopical preparations, or other means of illustration accompanying it, will become the property of the College, though by permission the essay may be printed for general circulation by the Heath scholar. This is one of the most valuable surgical prizes in the kingdom, and the competition should be keen.

The Société helvétique des sciences naturelles will hold its seventy-ninth meeting from August 2 to 5, at Zürich. This will be the sixth occasion on which the Society has met at that place, and it will do so very appropriately in August next, because the Zürich Société des sciences naturelles—the oldest of those existing in Switzerland—celebrates this year the 150th anniversary of its foundation. A number of papers have already been promised in the various sections into which the congress will be divided. All who desire to be present, or to contribute papers, are requested to communicate with the Secretary, Dr. Aug. Aeppli, Kinkelstrasse, Zürich IV., before July 15. The Swiss Societies of geology, botany, and entomology will meet at the same time as the Société helvétique des naturelles sciences. A geological excursion has been organised, under the direction of Prof. A. Heim, and there will also be a botanical excursion. Every one interested in the advancement and unity of science is cordially invited to attend the meeting.

At the Electrical Exposition in New York, a few days ago, messages were sent all round the world, and received back in a few minutes. A vast audience hailed with enthusiasm the return of the messages from their long circuits. The first surprise was the announcement that a message had been received within four minutes after sending it, having meanwhile twice crossed the continent of America and the Atlantic Ocean. At London the message was rewritten, and sent on to Tōkiō, and back to New York by a circuitous route, covering 27,500 miles in about fifty minutes. Another message, making another circuit of equal length, returned a few minutes later; while a message sent all round South America, came back in twenty-three minutes. The messages were dictated by Chauncey M. Depew, President of the New York Central and Hudson River Railroad, and Mr. Adams, President of the Niagara Falls Power Company. Mr. Edison received one or two of them. The messages will be preserved in the Smithsonian Institution, together with copies of all papers throughout the world that published them, so far as they can be obtained.

A slight shock of earthquake is reported to have been felt in West Cornwall, at five minutes to seven on Friday morning, May 29. An earthquake shock also occurred in Dumfriesshire, and a noise resembling a distant peal of thunder was heard. Furniture and crockery were agitated by the movement, which lasted a few seconds, and does not appear to have been attended by any damage of consequence.

It appears from the annual reports of the six Pasteur Institutes existing in Russia and Poland (St. Petersburg, Moscow, Warsaw, Odessa, Kharkoff, Samara, and Tiflis), that during the year 1892 no less than 2886 persons applied at the Institutes for anti-rabic treatment, as against 2976 in 1891. Out of them, 2763 persons were put under treatment. The percentage of deaths was, as usual, very high for wolves' bites, viz. from 2·22 to 37·5 per cent. in the different institutes; while for dogs' bites the percentage of deaths was insignificant, that is, from 0·5 to 1·05.

Among many articles of interest in the May number of the *Essex Naturalist*, is one by Mr. Henry Laver on "Potash Making in Essex: a lost rural industry." In the beginning of this century the preparation of alkali by the lixiviation, in large iron or copper pots, of the ashes of wood, straw, grasses, and other vegetable refuse, was a very common rural industry in Essex, the "pot-ash" thus produced being frequently converted at once into soap. The decay of this industry must be chiefly attributed to the production on the large scale of the cheaper soda-ash from salt, and to the introduction of coal instead of wood as fuel. Mr. Laver contrasts the healthful conditions under which the potash was produced a century ago, with those under which soda is produced at the present day; a contrast much to the disadvantage of the latter.

In the *Comptes rendus* for May 4, one of Maxwell's early proofs of the "error law" of distribution of velocity in the kinetic theory of gases receives severe criticism in the hands of M. J. Bertrand. In the work referred to, Maxwell claimed to have solved the problem of finding the law of distribution of speed in a system of molecules without making any assumptions as to the nature of these molecules or the forces between them beyond that, on account of the absence of all regular order, everything was distributed equally in all directions. After comparing Maxwell's problem to the favourite schoolboy question, "Given the dimensions of a ship, find the age of its captain?" M. Bertrand points out that the proof in question really involves a very important assumption, and one which he appears to regard as unjustifiable. If x, y, z be the velocity-components of a molecule in three directions at right angles, Maxwell states, or rather *assumes*, that the velocity x has no influence on the velocities y and z, their directions being independent, and hence that the number of molecules whose velocity-components lie between the limits $dx\,dy\,dz$ is represented by an expression of the form

$$N\,\phi(x)\,\phi(y)\,\phi(z)\,dx\,dy\,dz.$$

M. Bertrand considers that the x component *does* influence y and z, and that by neglecting this influence, which is great, Maxwell obtained a solution of an insoluble problem.

The kinetic theory also forms the subject of an article by Prof. Boltzmann in *Wiedemann's Annalen*, in which he attacks some views recently enunciated by Herr Zermelo. Prof. Boltzmann regards the Boltzmann-Maxwell Law as a theorem in probability, rather than a principle of abstract dynamics. There is nothing to preclude the *possibility* of the molecules of a gas behaving at any instant in a totally different manner from that indicated by the law, but the greater the number of molecules the more improbable does such a departure from the law become.

In the *Botanical Gazette* for April, an interesting case of mimicry is described, the seeds of the "Philippine island bean" from the coast near Manila, so closely resembling the quartz pebbles among which they fall, in shape, size, colour, lustre, hardness, and stratification, as to be indistinguishable from them except by a very close examination. The size and shape of the beans are both very variable, ranging from 10 to 23 mm.; some perfectly resemble well-rounded beach pebbles, while others mimic pebbles which have been broken across. Their colour varies from moderately dark to light drab, some giving a faint greenish tinge; others resemble pebbles of chalcedony or of crystallised quartz. Nearly all the specimens show a series of approximately parallel darker lines passing round, very suggestive of stratification. All are quite hard, cut only with difficulty with a knife, and give a clinking sound when shaken together in the hand. They are not affected by soaking in sea-water.

A MONOGRAPH of the *Crambidæ* (or grass moths) of North America, by Dr. C. H. Fernald, was issued by the Massachusetts Agricultural College in January of the present year. Much care seems to have been bestowed upon this essay, which extends to ninety-three pages, and is illustrated by three plates of details, and five coloured plates of quite unusual excellence, as well as occasional woodcuts.

THE interesting address on Meteorological Observatories, delivered by Mr. Richard Inwards before the Royal Meteorological Society, early in this year, is published in the April *Journal* of the Society, with illustrations of the Temple of the Winds, Athens, Greenwich Observatory, and Kew Observatory. Mr. Inwards has brought together a large amount of general information on meteorological observatories in various parts of the world.

THE report of the Marlborough College Natural History Society for 1895 has just been issued, and contains numerous articles, not only on local ornithology, entomology, botany and meteorology, but also on archæology, astronomy and chemistry. There are also illustrations of Wayland Smith's Cave, and of High Street, Marlborough, after the great storm of June 26, 1895. Times seem to have changed since classics and mathematics were regarded as the only subjects worth thinking about at a public school.

BY order of the Government of Madras, that Observatory has published a valuable series of daily, monthly, and yearly meteorological means, as a supplement to the volumes already issued giving the meteorological observations from 1796 to 1890. They are not intended as a discussion of those observations, but have been prepared specially for use in various offices which issue daily weather charts of Indian regions. The rainfall values extend over eighty years, and the barometrical means over fifty years.

WE have received the nineteenth report of the State Entomologist on the noxious and beneficial insects of the State of Illinois. It is the eighth report of S. A. Forbes, for the years 1893 and 1894 (1896); with a separately issued appendix on the Mediterranean Flour Moth (*Ephestia kuehniella*, Zell.) in Europe and America, by W. G. Johnson, Assistant Entomologist. These reports are drawn up in the usual elaborate American manner, and the main report is chiefly devoted to the Chinch Bug (*Blissus leucopterus*, Say) and to White Ants, and is illustrated with thirteen plates of a very miscellaneous character in connection with the ravages of these and other insects. Much attention is given in this report to experiments on the dissemination of vegetable parasites among insects.

THE latest number of the *Journal* of the Asiatic Society of Bengal (vol. lxiv. part ii. No. 3), contains articles of unusual interest and variety. Nearly three-quarters of the part are taken up with a list of the Butterflies of Sumatra, by Mr. De Nicéville and Dr. Martin; while Messrs. King, Prain and Pantling write on *Papaveraceæ*, new orchids from Sikkim, and on a new species of *Renanthera*. But in addition to these more technical entomological and botanical papers, Surgeon Lieut.-Colonel Ranking writes on artificial immunity to snake venom by inoculation or internal application, in ancient and modern times (compare Prof. Fraser's articles in recent numbers of NATURE); and Mr. Frank Finn commences a series of contributions to the theory of warning colours and mimicry, by recording his experiments in feeding a Babbler (*Crateropus canorus*) on protectively-coloured butterflies and other insects.

WE note the appearance of three new volumes in the extensive series which constitutes the Encyclopédie Scientifique des Aide-Mémoire, published by MM. Gauthier-Villars and G. Masson. One is the third volume on "Géométrie Descriptive," and it deals with changes of planes of projection, rotations, trihedrons, and polyhedrons. In "Calcul de Temps de Pose en Photographie," by M. H. Boursault, the complex problem of the conditions which affect calculations of the time of exposure is treated in a very satisfactory manner. Scientific photographers will find much exact and serviceable information in M. Boursault's little volume. A volume on "Les Tramways," by M. R. Seguela, is an account of methods and materials employed in the construction of tram-lines in France, the United States, Great Britain, and other countries.

THE volumes in Stanford's Compendium of Geography and Travel, now in course of reissue, have been subjected to such thorough revision and considerably enlargement, that they are practically new books. The work on Asia, for instance, first published in 1882 in one volume of 750 pages, has been expanded into two volumes of about 550 pages each, and the first, dealing with northern and eastern Asia, has just been published by Mr. Stanford. Mr. A. H. Keane is responsible for this volume, and he may be complimented upon the thoroughness with which he has performed his task of revision. If the forthcoming volume on southern and western Asia is as satisfactorily done as the one now published, the whole will form an admirable account of the geography of the Asiatic continent, and one which accurately records the results of the important expeditions made during the past few years.

RECENT events in the Transvaal have had the effect of increasing the number of visitors to the South African Museum, according to the annual report of the Trustees; and this connection is borne out by the fact that during January of the present year the number of visitors was 5574, three-fourths of which consisted of country people, while the other fourth consisted chiefly of new arrivals and inhabitants of the Cape Peninsula. Visits from the inhabitants of Cape Town are said to be comparatively rare. Several attempts were made during last year to procure some of the large South African mammals, but the Trustees have not yet been successful in obtaining specimens of the elephant, giraffe, hippopotamous, &c., to replace the defective ones in the Museum collection. A number of fossil remains procured by Mr. E. H. L. Schwarz from the Prince Albert district of the colony are being developed by him. Fragments of one of the fossil reptiles have been sent to Prof. Seeley for development and identification, and the animal has been provisionally named by him *Tetracynodon*. Reference is made in the report to the resignation of the Curator, Mr. R. Trimen, and the appointment of Mr. W. L. Sclater as his successor. We notice that on account of the increased requirements of the new Museum, the buildings of which were taken over by the Trustees at the end of last year, the annual subsidy has been raised from £1600 to £2000.

WE have received the meteorological results of the observations taken at the Bangalore, Mysore, Hassan and Chitaldroog observatories for the years 1893 and 1894. The stations were established by the Mysore Government, in accordance with the desire of the Government of India. In addition to the usual tables, the work contains diagrams giving the mean daily and monthly values of the various elements, and a map of the Mysore Province, showing the average annual rainfall for the twenty-five years (1870-1894). These diagrams exhibit at a glance the nature of the weather changes, much more easily than could be gathered from a mere collection of figures. They show clearly that the rise of temperature from the cold of January to the heat of March and April is much more rapid in Mysore than at Madras, where the climate is tempered by the influence of the sea. It is interesting to observe the interval between the mean dry and wet-bulb temperature throughout the year, and the daily range of temperature; the latter varies greatly, amounting to nearly 34° at Hassan, in January. The highest shade temperature in the two years was 99°·5 at Chitaldroog, in April 1893.

THE *Quarterly Journal* of the Geological Society for May is an unusually thick number, and its contents cover almost as wide a range of geological subjects as could be brought together. Palæontology is represented by the presidential address on the history of the Crustacea by Dr. Woodward, who also contributes papers on Cretaceous Crustacea from Vancouver, and on the only known fossil Octopod; while Mr. C. W. Andrews discusses the Plesiosaurian skull, and Mr. P. Lake continues his work on a group somewhat neglected of late years by British geologists—the Trilobites—with a study of the Silurian species of *Acidaspis*. In stratigraphy, Dr. Hicks contributes a paper in which he claims the Morte Slates as Silurian, and reopens in a new manner the North Devon controversy, while Miss Elles and Miss Wood show that there are Llandovery beds in the Conway district. The British Cretaceous rocks are subjected to a most detailed correlation—as regards the Speeton series by Mr. Lamplugh, and as regards the Cenomanian by Messrs. Jukes-Browne and Hill; the former author urging that some of the strata dealt with are strictly Jurassic, while the two latter show that the true Cenomanian of France represents our Lower Chalk only, and not our Upper Greensand. The only Tertiary geology in the journal concerns the Basaltic plateaus of North-western Europe and the river-system of the old land across which the lavas were poured, described in a most interesting paper by Sir Archibald Geikie. This last paper, along with one on a part of the same subject—the Skye granophyres—by Mr. Harker, represents also the petrological contributions to the journal. Important evidence is adduced by Prof. Edgeworth David of a Permo-Carboniferous glaciation of Australia. Finally, Prof. Hull's paper on the geology of the Nile, and Mr. Hill's, on transported Boulder Clay, must not be forgotten.

AN elaborate monograph on "The American Lobster," by Prof. F. H. Herrick, forming a part of the *Bulletin* of the United States Fish Commission for 1895 (pp. 1–252), has been issued as a separate publication. The memoir contains the results of a masterly study of the habits and development or general biology of the lobster, and is illustrated with the lavishness which is a feature of official publications of the United States. Until comparatively recent years the lobster was singularly neglected by naturalists; nevertheless, Prof. Herrick gives at the end of his memoir a list of more than two hundred papers referring to the Crustacea, of which the lobster may be styled the king. The subjects of the chapters in the present contribution to this literature are: habits and environment, reproduction, moulting and growth, defensive mutilation and regeneration of lost parts, large lobsters, enemies of the lobster, the tegumental glands and their relation to sense organs, variation in colour and structure, structure and development of the reproductive organs, habits of the lobster from time of hatching until the period of maturity, history of the larval and early adolescent periods, and embryology of the lobster. It will be seen from this brief statement that Prof. Herrick has studied many phases of the general biology of the lobster, and in all of them he adds to the previous knowledge of the subject. His observations are of scientific value, and many of the facts described, more particularly those relating to the larval development and reproduction, have important economic bearings. After some statistics pointing to the decline of the lobster fishery in the United States, Prof. Herrick remarks: "Civilised man is sweeping off the face of the earth, one after another, some of its most interesting and valuable animals by a lack of foresight and selfish zeal unworthy of the savage. . . . Thus, as we shall see, the American lobster occupies only a narrow strip along a part of the North Atlantic coast, and while it is probably not possible to exterminate such an animal, it is possible to so reduce its numbers that its fishing becomes unprofitable, as has already been done in many places. The only ways open to secure an increase in the lobster are to protect the spawn-lobsters, or to protect the immature until they are able to reproduce, or to take the eggs from the lobsters themselves, and hatch them artificially." For the sake of the persons engaged in the lobster fishery, it is to be hoped that measures will be taken in time to prevent its further decline in the United States.

THE additions to the Zoological Society's Gardens during the past week include a Caracal (*Felis caracal*) from India, presented by Captain E. F. Carter; a Spotted Cavy (*Cœlogenys paca*) from Trinidad, presented by Dr. F. G. C. Damian; a Common Otter (*Lutra vulgaris*), British, presented by Mr. Henry Laver; a Blue and Yellow Macaw (*Ara ararauna*) from South America, presented by Mrs. Browning; a —— Deer (*Cariacus paludosus*, ♂) from Paraguay, two Green-winged Doves (*Chalcophaps indica*), two White-backed Pigeons (*Columba leuconota*) from India, four Alligators (*Alligator mississippiensis*) from the Mississippi, four Dandin's Tortoises (*Testudo dandinii*) from the Aldabra Island, deposited; two Thick-tailed Opossums (*Didelphys crassicaudata*) from South America, four Gouldian Grass Finches (*Poëphila gouldiæ*), two Crimson Finches (*Estrelda phæton*) from Australia, purchased; a Sœmmerring's Gazelle (*Gazella sœmmerringi*, ♂), two Striped Hyænas (*Hyæna striata*), an Egyptian Ichneumon (*Herpestes ichneumon*), two Libyan Zorillas (*Ictonyx lybica*), two Fennec Foxes (*Canis cerdo*), two Ruppell's Vultures (*Gyps rüeppelli*), four Egyptian Vultures (*Neophron perenopterus*) from Egypt, received in exchange.

OUR ASTRONOMICAL COLUMN.

THE RING NEBULA IN LYRA.—The appearance of the brightest of the ring nebulæ, as seen with the Lick 36-inch refractor, is described by Prof. Barnard in *Ast. Nach.* No. 3354. The aperture of the ring was filled with a feebler nebulosity, which was estimated to be nearly midway in brightness between the brightness of the ring and the darkness of the adjacent sky. This aperture was more nearly circular than the outer boundary of the nebula, so that the ends of the ring were thicker than the sides. The following end of the ring had a slightly greater extension, which was less bright than the ring itself, and the entire nebula was of a milky colour. The central star was usually seen, but was never a very conspicuous object. The brightest region of the nebula lies in the northern part. Micrometric measurements of the nebula gave the following mean results:—

Position angle of major axis ...	65°·4
Outer major diameter	80″·9
Inner major axis	36″·5
Outer minor axis	58″·8
Inner minor axis	29″·4

A magnifying power of 520 was generally employed.

VARIABLE STAR CLUSTERS.—The discovery of a large number of variable stars in certain star clusters was announced a few months ago by Prof. E. C. Pickering (NATURE, vol. liii. p. 91). Since then a special investigation has been made of the variables forming part of the cluster M.5 Serpentis, N.G.C. 5904 (*Ast. Nach.* 3354). Forty-five photographs of this cluster have been measured by Miss Leland, and the measures include the greater portion of the forty-six variables previously discovered. The periods of these variables are in general very short, not exceeding a few hours. One of these, designated No. 18, which follows the centre of the cluster about 6′ and is south 5′, has a probable period of 11h. 7m. 52s., or 0·4638